APES (FINAL) Math review

The Metric System review:

1. You have a volkswagon bug car that can travel 100 miles per hour. How man km per hour is that?
2. Your mom’s minivan can reach a maximum speed that is only 70% of your volkswagon. What is the maximum speed of your mom’s minivan in km per hour?
3. How many milliliters are in 500 kiloliters? Express your answer in scientific notation.
4. Your electricity costs .33$ per watt-hour. If your bill was $99, how many Kwh of electricity did you use?

Population growth:

1. A county has a growth rate of 14%. What is its doubling time?
2. The CDR is 500 and the CBR is 630. What is the population growth rate?
3. If a city of population 10,000 experiences 200 births, 60 deaths, 10 immigrants, and 40 emigrants in the course of a year, what is its net annual percentage growth rate?
4. If a nation has a growth rate of 3.5%, how many years will it take for the population to double in size?
5. A country currently has a population of 200 million and an annual growth rate of 3.0%. If the growth rate remains constant, after 70 years, the population will be approximately:

Dimensional Analysis:

1. A large, coal-fired electric power plant produces 12 million kilowatt-hours of electricity each day. Assume that an input of 10,000 BTUs of heat is required to produce an output of 1 kWh of electricity.
2. **Calculate** the number of BTUs of heat needed to generate the electricity produced by the power plant each day.
3. **Calculate** the number of pounds of coal consumed by the power plant each day, assuming that one pound of coal yields 2,000 BTUs of heat.
4. **Calculate** the number of pounds of sulfur released by the power plant each day, assuming that the coal contains seven percent sulfur by weight.

11.) West Fremont is a community consisting of 3,000 homes. A small coal-burning power plant currently supplies electricity for the town. The capacity of the power plant is 12 megawatts (MW) and the average household consumes 8,000 kilowatt hours (kWh) of electrical energy each year. The price paid to the electric utility by West Fremont residents for the energy is $0.10 per kWh. The town leaders are considering a plan, the West Fremont Wind Project (WFWP), to generate their own electricity using 10 wind turbines that would be located on the wooded ridges surrounding the town. Each wind turbine would have a capacity of 1.2 MW and each would cost the town $3 million to purchase, finance, and operate for 25 years.

(a) Assuming that the existing power plant can operate at full capacity for 8,000 hrs/yr, how many kWh of electricity can be produced by the plant in a year?

B) At the current rate of electricity energy per household, how many kWh of energy does the community consume in one year?

c.) Assuming that the electrical energy needs of the community do not change during the 25-year lifetime of the wind turbines, what would be the cost to the community of the electricity supplied by the WFWP over 25 years? Express your answer in dollars/kWh.